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U.S. Patent No. 6,863,738 RD-28,011

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patentee: LAWRENCE B. KOOL, ET AL
Patent No.: 6,863,738
Issued: MARCH 8, 2005
Title: METHOD FOR REMOVING OXIDES AND COATINGS FROM A SUBSTRATE

Assistant Commissioner of Patents and Trademarks
Alexandria, VA
Attention: Certificate of Correction Branch

Certificate
JUN 13 2005
of Correction

S I R:

Enclosed are the following documents for the above-identified patent:

1. A request for a Certificate of Correction;
2. A PTO Form 1050-Certificate of Correction;
3. Page 2 of the Examiner's Amendment; and
4. A printout of the Claims as allowed in the application.

Respectfully submitted,

GENERAL ELECTRIC COMPANY

A. M. Agosti

ANN M. AGOSTI, PATENT COUNSEL
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Niskayuna, New York
Customer No. 006147
Dated: 6 June 05

U.S. Patent No. 6,863,738 RD-28,011

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patentee: LAWRENCE B. KOOL, et al.

Patent No.: 6,863,738

Issued: MARCH 8, 2005

Title: METHOD FOR REMOVING OXIDES AND COATINGS FROM A SUBSTRATE

REQUEST FOR CERTIFICATE OF CORRECTION

Commissioner for Patents and Trademarks
Alexandria, VA
Attention: Certificate of Correction Branch

S I R:

In accordance with 35 U.S.C. § 254 and 37 C.F.R. § 1.322, Patentee respectfully requests that a certificate of correction be issued for an error in the above-identified patent, incurred through the fault of the U.S. Patent and Trademark Office (hereinafter Office).

On March 8, 2005, US Patent 6,863,738 was issued containing an error in the patent as follows:.

> Claim 6, line 7 (formerly Claim 9, line 7) was amended per Examiners Amendemnt on 9/21/04 to remove the words "or a polymer" (copy attached).

Since the error was made by the Office and not by the Patentee, it is requested that a certificate of correction be issued, and that there be no additional fees charged for this request.

If there are any questions regarding this matter, please call Patentee's attorney, Ann M. Agosti, at telephone number (518)-387-7713.

Respectfully submitted,

GENERAL ELECTRIC COMPANY

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Niskayuna, New York
Customer No. 006147

Dated: 6 June 05

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UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,863,738 B2

DATED : March 8, 2005

INVENTOR(S) : LAWRENCE B. KOOL, ET AL

It is certified that an error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

IN THE CLAIMS:

In Claim 6, line 7 please DELETE --or a polymer--

MAILING ADDRESS OF SENDER:

Patent No. 6,863,738

GENERAL ELECTRIC COMPANY
CRD PATENT DOCKET RM 4A59
P.O. BOX 8, BLDG. K-1 - ROSS
SCHENECTADY, NEW YORK 12301

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FORM PTO 1050 (REV. 3-82)

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UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,863,738 B2

DATED : March 8, 2005

INVENTOR(S) : LAWRENCE B. KOOL, ET AL

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

IN THE CLAIMS:

In Claim 6, line 7 please DELETE --or a polymer--

MAILING ADDRESS OF SENDER:

Patent No. 6,863,738

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FORM PTO 1050 (REV. 3-82)

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Peter R. Hagerty on 9/21/04.

The application has been amended as follows:

The clause "or a polymer" has been deleted in claim 1, line 7.

The clause "or a polymer" has been deleted in claim 9, line 7.

The clause "or a polymer" has been deleted in claim 23, line 7.

2. The following is an examiner's statement of reasons for allowance: the amendment filed 9/10/04 (which was entered) and the instant Examiner's amendment obviated the rejections and objections presented in the previous Office Action. The examiner's position is that the prior art fails to teach or fairly suggest a method for removing oxidized product from a turbine components made from the claimed super alloys or from the coating applied to these components with composition comprising

Docket No. RD28011-2

CLAIMS

1. (Previously presented) A method for removing at least one of: (1) an oxidized product of a substrate from a surface of the substrate, wherein the substrate is a turbine component formed of an alloy selected from the group consisting of a nickel based alloy, a cobalt based alloy, and an iron based alloy ~~an alloy comprising nickel, chromium, aluminum, or at least one of the foregoing metals, or a polymer~~, or (2) an oxidized product of a metallic coating disposed on the substrate from a surface of the metallic coating, wherein the substrate is the turbine component formed of the alloy or a polymer, the method comprising the step of contacting the oxidized product of the substrate or the oxidized product of the metallic coating with an aqueous composition to remove a predetermined amount of the oxidized product of the substrate or a predetermined amount of the oxidized product of the metallic coating, wherein the aqueous composition consists essentially of an acid having the formula H_xAF_6 and water, wherein A is selected from the group consisting of Si, Ge, Ti, and Ga; and x is 1-6.

2. (Original) The method of claim 1, wherein x is 1-3.

3. (Original) The method of claim 1, wherein the acid is present at a level in the range of about 0.05 M to about 5 M.

4. (Original) The method of claim 3, wherein the acid is present at a level in the range of about 0.2 M to about 3.5 M.

5. (Canceled)

6. (Previously presented) The method of claim 1, wherein the aqueous composition is H_2SiF_6.

7. (Canceled)

8. (Canceled)

Docket No. RD28011-2

9. (Currently amended) ~~The method of claim 1,~~ A method for removing at least one of an oxidized product of a substrate from a surface of the substrate, wherein the substrate is a turbine component formed of an alloy selected from the group consisting of a nickel based alloy, a cobalt based alloy, and an iron based alloy an alloy comprising nickel, chromium, aluminum, or at least one of the foregoing metals, or a polymer, or an oxidized product of a metallic coating disposed on the substrate from a surface of the metallic coating, wherein the substrate is the turbine component formed of the alloy or a polymer, the method comprising the step of contacting the oxidized product of the substrate or the oxidized product of the metallic coating with an aqueous composition to remove a predetermined amount of the oxidized product of the substrate or a predetermined amount of the oxidized product of the metallic coating, wherein the aqueous composition consists essentially of an acid having the formula H_xAF_6, ~~wherein the aqueous composition further consists essentially of~~ at least one additional acid, and water, wherein A is selected from the group consisting of Si, Ge, Ti, and Ga; and x is 1-6.

10. (Previously presented) The method of claim 9, wherein the at least one additional acid has a pH of less than about 7 in water.

11. (Previously presented) The method of claim 10, wherein the at least one additional acid has a pH of less than about 3.5 in water.

12. (Previously presented) The method of claim 9, wherein the at least one additional acid is a mineral acid.

13. (Previously presented) The method of claim 9, wherein the at least one additional acid is selected from the group consisting of phosphoric acid, nitric acid, sulfuric acid, hydrochloric acid, hydrofluoric acid, hydrobromic acid, hydriodic acid, acetic acid, perchloric acid, phosphorous acid, phosphinic acid, alkyl sulfonic acids, and mixtures of any of the foregoing.

14. (Previously presented) The method of claim 9, wherein the at least one additional acid is phosphoric acid.

15. (Previously presented) The method of claim 9, wherein the at least one additional acid is present at a level less than about 80 mole %, based on the total moles of acid present in the aqueous composition.

16. (Previously presented) The method of claim 15, wherein the at least one additional acid is present at a level of about 20 mole % to about 70 mole %.

17. (Original) The method of claim 1, wherein the oxide material is treated in a bath of the aqueous composition.

18. (Original) The method of claim 17, wherein the bath is maintained at a temperature in the range of about room temperature to about 100°C, during treatment.

19. (Original) The method of claim 18, wherein the temperature is in the range of about 45°C to about 90°C.

20. (Original) The method of claim 18, wherein the treatment time is in the range of about 10 minutes to about 72 hours.

21. (Original) The method of claim 20, wherein the treatment time is in the range of about 60 minutes to about 20 hours.

22. (Canceled)

Docket No. RD28011-2

23. (Currently amended) A method for removing at least one of: (1) an oxidized product of a substrate from a surface of the substrate, wherein the substrate is a turbine component formed of an alloy selected from the group consisting of a nickel based alloy, a cobalt based alloy, and an iron based alloy, ~~comprising nickel, chromium, aluminum, iron, cobalt, or at least one of the foregoing metals, or a polymer~~ or (2) an oxidized product of a metallic coating disposed on the substrate from a surface of the metallic coating , wherein the substrate is the turbine component formed of the alloy or a polymer, the method comprising the step of exposing the oxidized product of the substrate or the oxidized product of the metallic coating to an aqueous composition to remove a predetermined amount of the oxidized product of the substrate or a predetermined amount of the oxidized product of the metallic coating, wherein the aqueous composition consists essentially of an acid having the formula H_xAF_6 and water, wherein A is selected from the group consisting of Si, Ge, Ti, and Ga; and x is 1-6, and wherein the precursors to said acid comprise any compound or group of compounds which can be combined to form the acid or its dianion AF_6^{-2}.

24. (Previously presented) A method for removing an oxide material from a diffusion- or overlay coating on the surface of a turbine engine component, comprising the step of contacting the oxide material with an aqueous composition to selectively remove the oxide material from the diffusion or the overlay coating, wherein the aqueous composition comprises H_2SiF_6, wherein the diffusion coating comprises an aluminide alloy, and wherein the overlay coating comprises a composition having a formula of MCrAl(X), wherein M is an element selected from the group consisting of Ni, Co, Fe, and combinations thereof, and wherein X is an element selected from the group consisting of Y, Ta, Si, Hf, Ti, Zr, B, C, and combinations thereof.

25. (Original) The method of claim 24, wherein the aqueous composition further comprises an additional acid selected from the group consisting of phosphoric acid, nitric acid, sulfuric acid, hydrochloric acid, hydrofluoric acid, and mixtures thereof, wherein the additional acid is present at a level less than about 80 mole %, based on the total moles of acid present in the aqueous composition.

26. (Original) The method of claim 24, wherein the oxide material is also initially present in at least one cavity within the turbine engine component, and is removed therefrom during treatment with the aqueous composition.

27. (Previously presented) A method for replacing a protective coating applied over a substrate, comprising the following steps:

(i) removing an oxide material from a surface of the protective coating disposed on the substrate by contacting the oxide material with an aqueous composition which comprises an acid having the formula H_xAF_6, or precursors to said acid, wherein A is selected from the group consisting of Si, Ge, Ti, and Ga; and x is 1-6;

(ii) removing the protective coating disposed on the substrate by contacting the protective coating with the aqueous composition; and

(iii) applying a new protective coating to the substrate.

28. (Previously presented) The method of claim 27, wherein steps (i) and (ii) are carried out simultaneously, using the same aqueous composition.

29. (Canceled)

30. (Original) The method of claim 28, wherein the aqueous composition further comprises at least one additional acid or precursor thereof.

31. (Original) The method of claim 30, wherein the additional acid is selected from the group consisting of phosphoric acid, nitric acid, sulfuric acid, hydrochloric acid, hydrofluoric acid, hydrobromic acid, hydriodic acid, acetic acid, perchloric acid, phosphorous acid, phosphinic acid, alkyl sulfonic acids, and mixtures of any of the foregoing.

32. (Original) The method of claim 27, wherein the coating removed in step (ii) and the coating applied in step (iii) are each selected from the group consisting of diffusion coatings and overlay coatings.